REMARKS

The amendments to paragraphs [0025], [0026], [0029], [0040] and [0053] of the present specification correct obvious typographical errors. The correction to paragraph [0034] is apparent from the remainder of the paragraph. Likewise, the amendments to paragraphs [0051] and [0067] correct errors apparent from Table 1 on page 19 of the subject application. The amendment to paragraph [0076] corrects an apparent typographical error in the location of the decimal point evident from the magniture of mean pore diameter values for similarly-shaped particles elsewhere in the specification, for example, in Examples 2-4 on pages 25-27 of the specification.

A. Claims Rejected As Anticipated By Anderson et al Based On Inherency

Claims 1-41 are rejected as being unpatentable under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,096,469 to Anderson et al ("Anderson et al patent").

The Examiner has taken the position that Anderson et al discloses production of mesoporous silica particles in which a source of silica, a surfactant (CTABr), a cosolvent (methanol) and a catalyst (ammonium hydroxide) are reacted, dried and calcined. Reference is made Examples 1 and 2 in which the resultant particles are ellipsoidal and spherical having sizes of 250-400 nm and 200-500 nm. The surfactant:cosolvent (molar) ratios in Examples 1 and 2 are said to be 0.007 to 1.

The Examiner recognizes that Anderson et al fail to disclose the claimed chain stacks or nanotubes, as well as pore size, surface area, mean pore volume, (page 2, last para. of Office action). However, the Examiner concludes that since Anderson et al discloses process is identical, the product would necessarily be identical and the properties recited in the present claims assumed to be inherent.

B. Applicants' Silica Particles Have Nanotube Inner Structure With Specific Orientation

Applicants have discovered a mesoporous product in the form of spherical silica particles having a diameter of between 0.1 and 1.0 micron in which the particles having an inner structure formed by chain stacks having pores extending in a substantially radial direction with respect to a center of said silica particles and in which the pores are interconnected with pores of an adjacent chain stack to form a nanotube structure and having a mean pore diameter between about 2.0 nm and about 4.0 nm, as measured by nitrogen adsorption. The spherical silica particles have a surface area between about 750 and about 1,050 m^2/g and a mean pore volume between about 0.75 ml/g and about 1.0 ml/g.

Examples 1-9 in paragraphs [0065] to [0086] of Applicants' specification describes the production of spherical silica particles having an inner structure formed by chain stacks having pores extending in a substantially radial direction with respect to a center of said silica particles and in which the pores are interconnected with pores of an adjacent chain stack to form a nanotube structure. Microphotographs using electron microscopy analysis reveal such inner structure in Applicants' Figures 2 and 3.

Likewise, Applicants have discovered elliptical silica particles having an inner structure formed by chain stacks with pores interconnected with pores of an adjacent chain stack to define a plurality of nanotubes in which the nanotubes ore oriented substantially parallel to the major axis of the particle. Examples 10-17 in paragraphs [0087] to [106] of Applicants' specification describe production of elliptical silica particles having an inner structure in which the nanotubes are oriented parallel to the major axis of the particle.

As indicated in Table 1 of Applicants' specification in paragraph [0053], which is based on 48 silica mesoporous particles (paragraph [0052]), production of spherical or

elliptical silica particles having the inner structure recited in the claims requires use of amounts of surfactant, organic cosolvent and hydrolysis catalyst effective to produce the spherical and elliptical inner structure claimed from the silica source utilized (paragraph [0057]).

C. Claims Amended To Recite Orientation of Spherical and Elliptical Particles

By the present Amendment, claim 1 has been amended to recite that the chain stacks are aligned substantially along the radius of the spherical silica particle and that the pores of the nanotube structure extend in a substantially radial direction with respect to a center of the silica particle to further define Applicants' particles. Support for this recitation is found in paragraph [0061], the Figures 2 and 3 of the drawing, original claim 4 and elsewhere throughout the specification. Similarly, claim 6, which relates to elliptical silica particles has been amended to recite that the nanotubes are oriented substantially parallel to the major axis, thereby incorporating the language of original claim 10. Also, process claim 15 has been amended to recite that the surfactant, organic cosolvent, hydrolysis catalyst agent and silica source are being used in amounts effective to form spherical silica particles in which pores of said nanotubes extend in a substantially radial direction with respect to a center of said silica particles or to form elliptical silica particles having a major axis and a minor axis in which nanotubes are oriented substantially parallel to said major axis. It is apparent from Table 1 and Examples 1-17 of the application that the effective amounts of constituents used depend on the nature of the particular constituents utilized.

D. Anderson et al Patent Does Not Disclose Claimed Inner Structure Inherently

The Anderson et al patent is silent as to production of the silica particles having the claimed inner structure as well as a process for achieving such inner structure. As indicated by the Federal Circuit, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The Examiner relies on "inherency" of the claimed product to supply the deficiencies of Anderson et al and, in particular, relies on the process of Anderson et al in Examples 1 and 2. Anticipation is a question of fact. *Rapoport v. Dement*, 254 F.3d 1053, 1057, 59 USPQ2d 1215, 1218 (Fed. Cir. 2001), and as demonstrated by Table 1 of Applicants' specification, the mere combination of a silica source with surfactant, cosolvent and catalyst without regard to the amount and nature of the constituent will not achieve the desired particle inner structure and nanotube or pore orientation. Thus, as stated by the Federal Circuit in *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999):

> To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' (Citations omitted).

Thus, the Examiner's reliance on the process disclosed in Anderson's Examples 1 and 2 has not provided sufficient extrinsic evidence that each and every missing element claimed is inherent in Anderson et al. *Rapoport v. Dement*, cited *supra*.

E. Dominguez Declaration Demonstrates Applicants' Claimed Particles Not Inherent

However, in order to further demonstrate that the claimed inner structure is, in fact, not inherent in Anderson et al as alleged, Applicants are submitting a Declaration Under § 1.132 of Dr. Jose Manuel Dominguez, in which the process of Anderson et al Examples 1 and 2 is reproduced, and spherical and elliptical silica particles produced by such process are tested. The Dominguez declaration demonstrates that the spherical and elliptical particles produced by the procedure in Examples 1 and 2 of the Anderson et al patent do not have the inner structure claimed by Applicants. Thus, the spherical and elliptical particles that are the subject of Applicants' claims are not inherent in Anderson et al.

As indicated in paragraphs 4 and 5 of the Dominguez declaration, the procedures of Examples 1 and 2 of the Anderson et al patent were reproduced, as indicated in Exhibits 1a and 1b attached to the Dominguez declaration. Thereafter, the product formed in Anderson et al Example 1 was tested by x-ray diffraction, nitrogen adsorption and transmission electron microscopy (paragraph 5). Electron microscopy analysis of the product is shown in Exhibits 2-7 attached to the Dominguez declaration. As indicated in paragraph 6 of the Dominguez declaration, over 95% of the particles are irregularly shaped or ellipsoidal, while some are almost spherical, with an "amorphous-like" inner structure with a random distribution of pores. Likewise, the product of Example 2 of Anderson was tested (paragraph 7) and the photographs resulting from electron microscopy analyzed (paragraph 8). As indicated in paragraph 9 of the Dominguez declaration, the samples from Examples 1 and 2 are silica particles having a great diversity of shapes whose inner pore structure is either one-dimensional or distributed at random (amorphous-like).

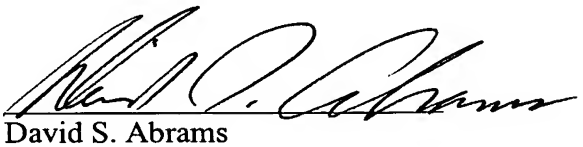
Paragraph 9 of the Dominguez declaration concludes that the inner pore structure of the spherical particles produced in Examples 1 and 2 of the Anderson patent do not have an

inner structure formed by chain stacks aligned along the radius of the spherical particle, as do Applicants' spherical particles, as discussed in paragraph 11 and shown in Exhibits 14 and 15 of the Dominguez declaration. Likewise, the Dominguez declaration concludes in paragraphs 9 and 14 that the Anderson et al Examples 1 and 2 do not produce elliptical silica particles that have pores aligned parallel to the major axis of the particle, as are produced by Applicants in Examples 10-17 of Applicants' application (paragraphs 12 and 14).

The Dominguez declaration further indicates (paragraph 15) that even when substituting a different silica source, cosolvent and surfactant in the procedure of the Anderson et al Examples 1 and 2, the resulting silica particles shown in attached Exhibits 23-28 do not have the inner structure claimed by Applicants.

Since the Dominguez declaration demonstrates that the claimed silica spherical and elliptical particles are not inherent in the Anderson et al process, the rejection of claims 1-9, and 12-41 as being anticipated by Anderson et al should be withdrawn and the application passed to issue. Such action is earnestly solicited.

Respectfully submitted,



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